UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/754,010	01/08/2004	Paul Reuben day	ROC920030366US1	7130

30206 7590 10/06/2008

IBM CORPORATION
ROCHESTER IP LAW DEPT. 917
3605 HIGHWAY 52 NORTH
ROCHESTER, MN 55901-7829

EXAMINER	
LOVEL, KIMBERLY M	

ART UNIT	PAPER NUMBER
2167	

MAIL DATE	DELIVERY MODE
10/06/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/754,010	DAY ET AL.	
	Examiner	Art Unit	
	KIMBERLY LOVEL	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-8 and 10-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3-8 and 10-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This communication is in response to the Amendment filed 20 June 2008.

2. Claims 1, 3-8 and 10-12 are currently pending and claims 2, 9 and 13-21 have been canceled. In the Amendment filed 20 June 2008, none of the claims were amended. This action is made Final.

Claim Rejections - 35 USC § 101

3. The rejection of claim 15 under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter has been withdrawn as necessitated by the cancellation of claim 15.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3-8 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the article "Efficient Mid-Query Re-Optimization of Sub-Optimal Query Execution Plans" by Kabra et al (hereafter Kabra) in view of US PGPub 2005/0177557 to Ziauddin et al (hereafter Ziauddin).

Referring to claim 1, Kabra et al disclose a method for automatic handling of errors within a database engine (see abstract, lines 6-8 – the sub-optimality is considered to represent the *error*), including the further limitations of:

detecting an error while executing a query access plan, and wherein the query access plan is of the type generated by a query optimizer (see page 109, column 2, lines 34-37 and page 110, column 1, 10-15 – the error is found during execution of the execution plan; the execution plan is considered to represent the *query access plan*);

in response to detecting the error (see page 109, column 2, line 34 – page 110, column 1, line 4 – after the error is determined the query plan is rebuilt since the remainder of the query plan is based on the estimate), automatically rebuilding the query access plan with query optimizer to generate a new query access plan (see page 110, column 1, lines 2-4 and lines 13-15 – upon the determination that the plan is sub-optimal, the query optimizer is re-invoked to generate a new execution plan); and

executing the new query access plan to generate at least a portion of a result set for storage or display (see page 110, column 1, line 15 – the fresh new execution plan for the query is executed). However, Kabra fails to explicitly disclose the further limitation wherein the error is an execution error of a type that halts execution of the query access plan. Ziauddin discloses execution of a query plan (see abstract), including the further limitations of detecting an error while executing the plan, wherein the error is an execution error of a type that halts execution of the query access plan and in response to detecting the error, automatically rebuilding the query access plan to generate a new query access plan (see [0017]).

It would have been obvious to one of ordinary skill in the art to use Ziauddin's steps for automatically rebuilding a plan after an error has been detected that causes execution to fail with method for query re-optimization as disclosed by Kabra which detects errors due to optimization. One would have been motivated to do so in order to improve the performance of applications through the generation of optimal plans (Ziauddin: see [0003]).

Referring to claim 3, the combination of Kabra and Ziauddin (hereafter Kabra/Ziauddin) discloses the method of claim 1, wherein the error is a function check [error in the join] (Kabra: see page 109, column 2, lines 29-33).

Referring to claim 4, Kabra/Ziauddin discloses the method of claim 1 further comprising the steps of:

receiving another error while executing a function within the new query access plan; identifying a first implementation method of the function within the new query access plan; and rebuilding the new query access plan by replacing the first implementation method with a second implementation method of the function so as to generate a rebuilt query access plan (Ziauddin: see [0029]).

Referring to claim 5, Kabra/Ziauddin discloses the method according to claim 1, further comprising the step of: logging information about the error, and the new query access plan (Kabra: see page 9, column 1, lines 16-27).

Referring to claim 6, Kabra/Ziauddin discloses the method according to claim 1, further comprising the step of: reporting the error (Kabra: see page 109, column 1, lines 16-27).

Referring to claim 7, Kabra et al disclose a method for automatic handling of errors within a database engine (see abstract, lines 6-8 – the sub-optimality is considered to represent the *error*), including the further limitations of:

receiving an error while executing a function within a query access plan and wherein the query access plan is of the type generated by a query optimizer (see page 109, column 2, lines 34-37 and page 110, column 1, 10-15 – the error is found during execution of the execution plan; the execution plan is considered to represent the *query access plan*);

rebuilding the query access plan with the query optimizer (see page 110, column 1, lines 2-4 and lines 13-15 – upon the determination that the plan is sub-optimal, the query optimizer is re-invoked to generate a new execution plan); and

executing the new query access plan to generate at least a portion of a result set for storage or display (see page 110, column 1, line 15 – the fresh new execution plan for the query is executed). However, Kabra fails to explicitly disclose the further limitation wherein the error is an execution error of a type that halts execution of the query access plan; and identifying a first implementation method of the function within the new query access plan; and rebuilding the new query access plan by replacing the first implementation method with a second implementation method of the function so as to generate a rebuilt query access plan. Ziauddin discloses execution of a query plan (see abstract), including the further limitations of detecting an error while executing the plan, wherein the error is an execution error of a type that halts [abort] execution of the query access plan (see [0015] and [0017]); identifying a first implementation method of

the function within the new query access plan (see [0029]); and rebuilding the new query access plan by replacing the first implementation method with a second implementation method of the function so as to generate a rebuilt query access plan (see [0017]).

It would have been obvious to one of ordinary skill in the art to use Ziauddin's steps for rebuilding a plan after an error has been detected that causes execution to fail with method for query re-optimization as disclosed by Kabra, which detects errors due to optimization. One would have been motivated to do so in order to improve the performance of applications through the generation of optimal plans (Ziauddin: see [0003]).

Referring to claim 8, Kabra/Ziauddin discloses the method of claim 7, wherein the function is one of a join function [error in the join], an indexing function, a grouping function, and an ordering function (Kabra: see page 109, column 2, lines 29-33).

Referring to claim 10, Kabra/Ziauddin discloses the method of claim 7, further comprising the steps of:

receiving another error while executing the function within the new query access plan; and rebuilding the new query access plan by replacing the second implementation method with a third implementation method of the function (Ziauddin: see [0029]).

Referring to claim 11, Kabra/Ziauddin discloses the method according to claim 10 further comprising the step of: logging information about the error, the another error, and the new query access plan (Kabra: see page 109, column 1, lines 16-27).

Referring to claim 12, Kabra et al disclose a method for automatic handling of errors within a database engine (see abstract, lines 6-8 – the sub-optimality is considered to represent the *error*), including the further limitations of:

executing a query access plan comprising a plurality of functions, each function including a first implementation method, and the query access plan of the type generated by a query optimizer (see page 109, column 2, lines 34-37 and page 110, column 1, 10-15);

detecting a first error when executing a first function (see page 109, column 2, lines 34-37 and page 110, column 1, 10-15 – the error is found during execution of the execution plan; the execution plan is considered to represent the *query access plan*);

rebuilding the query access plan to generate a new query access plan with the query optimizer (see page 110, column 1, lines 2-4 and lines 13-15 – upon the determination that the plan is sub-optimal, the query optimizer is re-invoked to generate a new execution plan); and

executing the new query access plan to generate at least a portion of a result set for storage or display (see page 110, column 1, line 15 – the fresh new execution plan for the query is executed). However, Kabra fails to explicitly disclose the further limitations wherein the error is an execution error of a type that halts execution of the query access plan; receiving a second error while executing the first function within the new query access plan; rebuilding the new query access plan by replacing the first implementation method with a second implementation method of the function. Ziauddin discloses execution of a query plan (see abstract), including the further limitations of

detecting an error while executing the plan, wherein the error is an execution error of a type that halts execution of the query access plan (see [0015] and [0017]); receiving a second error while executing the first function within the new query access plan (see [0029]); rebuilding the new query access plan by replacing the first implementation method with a second implementation method of the function (see [0017]).

It would have been obvious to one of ordinary skill in the art to use Ziauddin's steps for rebuilding a plan after an error has been detected that causes execution to fail with method for query re-optimization as disclosed by Kabra which detects errors due to optimization. One would have been motivated to do so in order to improve the performance of applications through the generation of optimal plans (Ziauddin: see [0003]).

Response to Arguments

6. Applicant's arguments filed in regards to the prior art rejections of claims 1, 3-8 and 10-12 have been fully considered but they are not persuasive.

7. Referring to applicants' arguments on page 6 of the Remarks in regards to claim 1, the applicants state "However, contrary to the Examiner's assertion, Ziauddin adds nothing to the rejection because just like Kabra, Ziauddin does not teach or suggest an execution error that halts execution of a query access plan. The errors that are addressed in Ziauddin are runaway errors, which result when a query runs longer than expected."

The examiner respectfully disagrees that Ziauddin fails to teach the limitation. The claim limitation states "wherein the error is an execution error of a type that halts execution of the query access plan." On page 6 of the Remarks, the applicants list examples of different types of errors. However, it is noted that when the claim limitation is given the broadest reasonable interpretation, the bounds of the term error is not limited to these examples. Ziauddin states in paragraph [0017], lines 12-18 "The auto tuning optimizer can also identify a query that has been executing longer than predicted, generate auto tuning hints for the statement, and build an improved execution plan for the statement with the auto tuning hints. If the new plan can be executed in significantly less time, than the current plan, then the current plan can be aborted and the new plan can be run." The examiner associates the concept of "a query that has been executing longer than predicted" as being the error. This error causes the execution of the current plan to be aborted. Therefore, even though the error is not one of the types of errors listed in the examples given by the applicants, the error is still considered to meet the requirements of the claimed limitation.

On pages 7-8 also in regards to the same limitation mentioned above, the applicant continues to argue "In Ziauddin, the optimizer aborts a query after selecting an appropriate candidate, so it is the optimizer that actually halts the query."

The examiner agrees that the optimizer halts the execution of the plan, however, the examiner disagrees that this teaches away from the requirements of the claimed limitation. The claim merely requires that the error halts the execution of the query, it fails to limit the means of how the error halts execution.

This response also applies to the arguments presented regarding claims 7 and 12.

8. Referring to applicants' arguments on pages 7-11 in regards to claim 7, the applicants state "First paragraphs [0029] and [0017] of Ziauddin merely disclose statistics and profiling for generating the new access plan in the background by the ATO. However, these paragraphs do not teach or suggest any function or the function related implementations."

The examiner respectfully disagrees. The collection of statistics is correlated to the execution of a function. How the statistics are implemented the first time is considered to represent the first implementation and when they are corrected, it is considered to be the second implementation.

This response also applies to the arguments presented regarding claim 12 on pages 11-13.

9. The rejections of dependent claims 3-6, 8, 10 and 11 are maintained for the reasons stated above in regards to the arguments of independent claims 1, 7 and 12.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIMBERLY LOVEL whose telephone number is (571)272-2750. The examiner can normally be reached on 8:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cottingham can be reached on (571) 272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John R. Cottingham/
Supervisory Patent Examiner, Art Unit 2167

Kimberly Lovel
Examiner
Art Unit 2167

25 September 2008
kml